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THE NATIONAL SHIPBUILDING RESEARCH PROGRAM

Environmental Training Modules Module 7 - Environmental Requirements of Concern to Shipyards

U.S. DEPARTMENT OF THE NAVY
CARDEROCK DIVISION,
NAVAL SURFACE WARFARE CENTER

in cooperation with
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ENVIRONMENTAL TRAINING MODULES

MODULE 7

ENVIRONMENTAL REQUIREMENTS OF CONCERN TO SHIPYARDS

Prepared by:

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May 1999

NSRP 0547
(N1-94-02)

TRAINING MODULES OVERVIEW

Executive Summary and User s Guide (NSRP 0540) Gives an overview of the 10 module set of environmental training modules, plus key issues involved in training in general. Instructions are supplied for how the modules can be modified to suit individual shipyards, as well as hardware and software requirements.

Module 1 (NSRP 0541) **Good Environmental Practices**
Content: Craft/trade-specific training on items that workers must deal with on a regular basis – material handling, labeling, waste generation/minimization, requirements awareness.
Recipients: New employees on arrival, and existing workers as a refresher.

Module 2 (NSRP 0542) **Environmental Practices for Specific Craft/Trade Groups**
Content: Specific training on air, hazardous materials, waste minimization, and related environmental considerations, with a focus on the generator personnel and their individual practices and procedures. Emphasis on those personnel likely to encounter a high incidence of problems during their regular duties.
Recipients: Specific craft/trade groups of workers.

Module 3 (NSRP 0543) **Shipyard Incident Response Training**
Content: Detailed presentation of response requirements specified by OSHA. Basic ingredients of a viable program for a shipyard – what is required and how to reach a satisfactory state of readiness. Includes specific duties of all participants, as well as how to ensure coordination and a common focus. This Module will provide the shipyards with an in-house capability for conducting this important training.
Recipients: Environmental Manager, Environmental Staff Personnel, Safety Engineer, Safety Personnel, Fire Department Personnel, Laboratory Staff and Technicians, Emergency Response Coordinator, Medical Personnel.

Module 4 (NSRP 0544) **Shipyard Oil Pollution Prevention and PIC Training**
Content: Provides a detailed overview on the federal regulatory oil pollution prevention and response requirements. Also contains specific training material for those shipyard employees with designated "Person in Charge" responsibilities.
Recipients: Ship and Craft Managers and Leadmen, Environmental and Safety Department Personnel, designated Persons in Charge.

Module 5 (NSRP 0545) **General Environmental Awareness**
Content: Overview of environmental statutes and regulations affecting shipyards, including responsibilities for compliance including both civil and criminal penalties for non-compliance. Includes an overview and explanation of environmental processes - how laws are formulated, the role of environmental groups, consultants, advisers.
Recipients: Senior Management

Module 6 (NSRP 0546) **Technical Overview of Environmental Statutes and Regulations**
Content: A general but in-depth overview of all environmental statutes and regulations with a focus on shipyard interests, and emphasis on the technical aspects of the requirements.
Recipients: Environmental Managers and staff personnel.

Module 7 (NSRP 0547) **Environmental Requirements of Concern to Shipyards**
Content: General overview of ALL requirements as they apply to shipyards. Emphasis on technical aspects and actions needed for compliance, rather than on the penalties for non-compliance. Includes overall strategy for developing a strong environmental posture.
Recipients: Senior Management, Supervisors, Generator Personnel; all workers who interface with environmental matters.

Module 8 (NSRP 0548) **Generation/Treatment/Minimization of Hazardous Waste**
Content: Discussion of regulatory requirements and statutes that apply to shipyard hazardous waste activities. Stresses the high points of the laws, and how to satisfy them. Includes overview of training provided to hazardous waste operators.
Recipients: Middle-level Managers

Module 9 (NSRP 0549) **Hazardous Waste Operator Training**
Content: Detailed training on practices and procedures performed by hazardous waste operators. Includes reclamation techniques, safe handling practices, labeling/marking, inventory control, hazard minimization.
Recipients: Hazardous Waste Operators; helpers and assistants

Module 10 (NSRP 0550) **Environmental Training for Subcontractor Personnel**
Content: Briefing on environmental requirements and considerations applicable to all Subcontractor Personnel entering a shipyard environment.
Recipients: Subcontractor Personnel; visitors to a shipyard; transient personnel such as delivery agents, auditors, and oversight personnel.

Title: Environmental Requirements of Concern to Shipyards

Audience: Senior Management, Supervisors, Generator Personnel, all workers who interface with environmental matters.

Time and Frequency: 1 hour/annual

Training Module Outline:

I. Introduction to Shipyard Environmental Issues

II. Environmental Management Systems

- A. Integrating Environmental Management into Shipyard Operations Management
- B. Process-Oriented Environmental Training

III. Shipyard Process-Based Environmental Requirements

- A. Surface Preparation
  1. Dry Abrasive Blasting
  2. Hydroblasting
  3. Ultra High Water Jetting
  4. Chemical Stripping
  5. Mechanical Stripping
- B. Marine Coating Application
  1. Pre-construction primmer
  2. Performance coatings
     a) Antifoulant Coatings
     b) Others
- C. Internal Combustion
  1. Cranes
  2. Generator Sets
- D. External Combustion
  1. Boilers
  2. Furnaces
- E. Bilge and Tank Cleaning
- F. Petroleum Transfers

Environmental Issues of Concern to Shipyards

Introduction to Shipyard Environmental Issues

SESSION TITLE: Introduction to Shipyard Environmental Issues

OBJECTIVE: To gain an understanding of why the shipyard is subject to environmental requirements and how these issues can be managed.

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Introduction. Shipyards, engaged in both new construction and repair activities, are subject to numerous environmental requirements, both by law and regulation. The burden of meeting these requirements can seem nearly impossible to many people in the shipyard. In addition to the existing requirements, it sometimes appears that new laws and regulations are being enacted faster than it is possible to keep up with them. Federal, state and local agencies all have environmental requirements that can effect the way the shipyard does business. You may have asked yourself questions similar to the following:

- Why are shipyards subject to so many environmental requirements?
- How can environmental requirements be implemented into the shipyard work processes in a cost effective way?
- What liability does the shipyard incur for poor environmental practices?
- Do environmental compliance activities in the shipyard really result in improvements to air, land and water quality, or are these activities mostly a paperwork exercise?
- How does the shipyard know what resources to allocate to environmental compliance and pollution prevention activities?
- Can the shipyard afford the cost of environmental management activities?

In order to answer these questions effectively, a systems management approach to environmental issues must be taken. Simply put, this means that you must apply the same type of structure in making sound environmental decisions as you would when making sound business decisions. Additionally, a systems

management approach implies that the life cycle costs of environmental business decisions must be factored into the equation, versus the short term costs of compliance activities.

Several of the key elements of a systems management approach to environmental issues facing the shipyard include the following:

- Leadership and Ethics
- Risk Management
- Interacting with External and Internal Customers
- Establishing a Framework for Sound Business Decisions on Environmental Issues
- Environmental Management Programs

Each of the above mentioned elements is important to maintain the shipyard in an environmentally pro-active posture, reducing long term liability and improving the efficiency of the environmental management program. The combination of these elements will help to ensure the long term economic viability of the shipyard, improve relationships between the shipyard and its customers and community, and reduce compliance costs to the greatest extent possible.

Introduction to Shipyard Environmental Issues

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Environmental Issues of Concern to Shipyards

SESSION TITLE: Environmental Management Systems

OBJECTIVE: To present an overview of an environmental management systems concept.

Introduction: Every decision (or failure to make a decision) concerning environmental issues effecting the shipyard will have a consequence. In this manner, environmental management is no different that any other business management decision made in the shipyard. Good business decisions usually result from within an integrated managerial framework, utilizing sound business practices within the established company culture. The same is true for good environmental decisions.

Environmental management systems typically consist of the same elements as production management systems:

- Polices must be established to set the goals.
- Procedures are developed to ensure that actions are consistent with the polices.
- Responsibility for implementing the program is assigned within the company organization.
- Authority to implement the program is granted to those persons with assigned responsibilities to allow them to implement the procedures.
- Resources are allocated to ensure that the goals are met within the established time frame.
- Measurement standards are developed to gauge progress toward achieving the goals.
- Auditing is performed to verify performance and identify required corrective actions.
- Accountability for achieving the goals is established for those with assigned responsibilities.

When these elements are combined, a management system is created. It is important to note that any management system will fail to achieve its goals if all of the required elements are not fully implemented. For example, policies can be established and procedures developed, but if the responsible person is not granted the necessary authority or provided with the required resources, it will be impossible to achieve the goal.

Environmental Management Systems

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Environmental Issues of Concern to Shipyards

Environmental Management Systems Elements: Over the last decade, several systems have been developed or adapted to the process of industrial environmental management. Most of these systems have included the elements described above. Understanding the role of each element in achieving the shipyard's goals is vital to effectively implementing the system.

Environmental Management Systems

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- Policies. The policy statement is intended to clearly state the goal that the shipyard intends to meet. A policy statement is usually a long term (one year or greater) goal which may have multiple milestones which must be met before the policy goal is achieved. For example, a company may have a waste minimization policy which states: "ABC Company will reduce its baseline hazardous waste generation by 10% per year for the next five years, resulting in a 50% decrease in waste volume by the year 2002." This policy both establishes the overall goal (50% reduction by the year 2002) as well as milestones against which progress toward the goal can be measured (10% reduction per year for the next five years).

  When a policy is established, it is important to frame the policy statement is such a way that it can be measured. For example, a policy statement which reads "ABC Company will reduce air emissions to the greatest extent possible" is too vague to be measured. Questions as to what emissions are to be reduced, and in what quantity, are subjective and will be interpreted differently depending upon the reader. Since no definitive measurement can be made, it will be impossible to determine if the policy goal is ever achieved.

- Procedures. Procedures are merely written documents which describe how an process will take place. They are necessary in that they ensure a process will be performed consistently no matter who performs the action. Procedures state the who, when, what, where and how of a process. They can be used to describe activities, such as generating required reports, or processes, such as operating a solid waste compactor.

Procedures are often time consuming to write and cannot cover all conceivable situations which may arise during an activity or process. Procedures also frequently need to be updated or revised as activities and/or processes change. Despite these shortcomings, solid and well drafted procedures are the key to consistent and efficient implementation of an environmental management system.

- Responsibility. The responsibility to implement procedures and achieve the policy goals must be assigned to an individual within the shipyard. Failure to assign this responsibility will result in the failure of the management system to achieve its goals. Remember, management systems are merely the map or guide on how to achieve goals in an efficient manner. It is the work of the individual that obtains the desired results. Responsibility is the element that gives any plan its human component.

- Authority. No action is implemented in the shipyard without authority. Basically stated, authority is the right to allocate resources (including financial, human and equipment) to achieve a goal. It also includes the right to enforce company authorized discipline as necessary to correct deficiencies in personnel actions. Authority is granted by senior management to individuals with assigned responsibility to achieve goals. It is important that the granting of authority to those individuals with environmental management responsibility is clear and well understood by the other managers in the shipyard.

- Resources. Resources to meet the challenge to achieving the goal within the stated time-frame is the real test of the company's commitment to its policy goals. Progress toward goals is both a combination of the management skills of the individual with assigned responsibility and the resources that person is given to implement the required procedures. The right combination of skills and resources culminates in the most efficient system, producing the greatest results with the least resources. However, even the most

Environmental Management Systems

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skillful manager cannot achieve the desired result if resources are inadequate.

- Measurement. Progress toward the achievement of policy goals must be measured. Measurements can take any required form necessary to effectively measure progress, such as pounds of emissions reduced, percent of hazardous waste landfilled, percent of goal achieved, number of worker comp claims received, etc. It is best to define the units of measurement in the policy goal itself. The units of measurement will then be consistent over the period of time required to reach the goal.

  Measurements are usually compared against an established baseline, such as percent increase in waste recycled in 1996 as compared to waste recycled in 1997. It is important to select the proper baseline measurement when you use comparative measurements. Choosing a baseline that could be effected by variables outside your control will skew your progress measurements. For example, suppose you established a goal to reduce hazardous waste generation by 50% within 5 years. Your baseline measurement should be the volume of hazardous waste generated in the baseline year, not the cost of disposal in the baseline year. The company's cost of disposal may increase or decrease for reasons unrelated to volume of waste generated and therefore, it would represent an erroneous indication of progress toward your actual goal.

- Auditing. Auditing is the process of using independent observers of fact to confirm performance. Auditing is an important aspect of environmental systems management in that it can both substantiate performance and identify areas where corrective actions are required. Environmental management is a complex field combining elements of law, science, engineering and industrial management. Implementation of an environmental management system often demands that "battle field" decisions be made to prevent production inefficiencies. The process of auditing can assist the environmental manager in sharpening these complex set of skills.

Environmental Management Systems

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Auditing can be successfully performed by independent third parties, such as environmental consulting firms, or independent in-house personnel such as environmental personnel from different company divisions. The key element is establishing and maintaining the auditor's independence from the subject of the audit.

- Accountability. Accountability is the act of comparing progress towards established policy goals and the performance of the responsible individual. Accountability typically takes the form of a job performance review, on which promotions, salary increases and bonuses will be based. Accountability goes hand in hand with responsibility. If responsibility is assigned, but the individual is not held accountable, there is no incentive to perform.

All the above elements combine to produce a management system, and can be applied to an environmental management system. An important fact to remember is that all the elements are interrelated, and as such, the efficiency of the system will be impaired if all the elements are not implemented.

Environmental Management Systems

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Environmental Issues of Concern to Shipyards

SESSION TITLE: Process-Oriented Environmental Training

OBJECTIVE: To provide an understanding of how environmental requirements in the shipyard can be integrated into the shipyard production operations.

Process-Oriented Environmental Training

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Introduction: Understanding which environmental statutes and regulations affect operations in the shipyard is only the first step in integrating these requirements into production activities. While it is senior management that makes the commitment to environmental management policy goals, it is at the level of the deck plate worker where the required activities must take place. Training is the mechanism that bridges the gap between policy and implementation.

In the past, environmental training often consisted of instructing workers as to the regulatory requirements. Application of the regulations to the process was left to the individual worker. The success of this style of training in achieving consistency and correct implementation was usually poor. Environmental requirements were too numerous, diverse and, oftentimes, required contextual interpretation prior to implementation. For example, a shipyard employee working in the Facilities Department may be tasked with ensuring that the drains in the bathroom are not clogged. To accomplish this task he is provided with an "off-the-shelf" drain cleaning chemical product containing potassium hydroxide. This product is hazardous because it is very caustic. On Monday, this worker can pour this caustic material down a sink drain if his intent is to clean the drain. On Tuesday, this same worker can pour the same material down the same drain *to dispose of waste residual product*, and be committing a violation of hazardous waste disposal laws. The only difference between these two scenarios is the intent of the individual. In the first case, the intent is to clean the drain. In the second, the intent is to dispose of the waste. These types of required contextual interpretations of environmental requirements make implementation difficult.

In an effort to overcome these types of inherent implementation problems and to improve training effectiveness, Process Oriented Training ("POT") techniques

have been adapted to environmental training. POT focuses on the process to be conducted, i.e., welding, pipefitting, etc., and what activities are being performed by the worker when he is engaged in the process. In this context, the environmental regulatory requirements become an integrated element of the process and activity.

Process-Oriented Environmental Training

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Total Quality Environmental Training: Total Quality Environmental Training ("TQET") is an example of process oriented environmental training. Compliance training under TQET is process owner focused. Its goal is to provide the process owner with the tools to ensure a compliance operation and to make day-to-day compliance decisions. It also integrates the compliant activities into the process activities. A TQET training program is initiated by first developing a detailed process description. From this process description, a set of environmental training requirements is assembled and flow-charted together with the process description. Training documents for each subject area are assembled into an operations manual for the process.

An example is provided below to illustrate this process.
Example Process Description:

The following process description was written for a solid waste compactor operator working in a shipyard in California. State and federal environmental requirements are addressed as required training elements. Training requirements will vary depending the location of the operation.

Job Title: Solid Waste Compactor Operator

Job Description: Receives solid waste from all sources with the company. Process waste using physical and manual sorting equipment and compactor. Stores compacted waste until picked up by waste hauling company. Arranges for waste hauls as required. Maintains all required documentation, and files all required reports.

Equipment Description: One Arant Conveyor Loader, Model 345.A, and one Willcomb 6 Ton Diesel Hydraulic Ram Compactor.

Environmental Issues of Concern to Shipyards

Process Description: Solid waste is transported to the compactor operation site in ½ yard skip tubs by the duty forklift operator. Waste is delivered starting at 0730 (first shift) and continues through the day at various intervals, depending on need. Operations cease at 1600. During peak production times, overtime operations into second shift and weekends is required.

The duty forklift operator drops off a full skip box at the loading station and retrieves an empty skip box which is returned to work site. The Compactor Operator, using an electric chain lift, empties the skip box onto the conveyor loading pan. The waste is visually inspected by the Operator. Any metal debris is removed and placed in a recycling bin. If potentially hazardous waste is discovered, the operator segregates the waste into drums and/or bins maintained at the site for this purpose. The conveyor is operated and the waste is loaded into the compactor. This process is repeated until the compactor loading chamber is full (approximately 1 ton). When the chamber is full, the compactor is started and the hydraulic ram is activated. The ram compresses the waste into the compaction chamber. The ram is withdrawn and the loading chamber is filled again.

When the compaction chamber is completely filled and compressed to the maximum ram pressure of 6 tons/ sq. ft., the compactor doors are released and the load is transferred to a forty cubic yard open top roll-off. The entire process is repeated until the roll-off is full. At this point the roll-off is moved to the storage/pick-up site and an empty roll-off is positioned at the compactor. When two empty roll-offs remain in storage, the operator submits a chit to the facilities clerk requesting a pick-up by the company's waste hauler.

The waste hauler removes the full roll-offs to the city municipal land fill. Loads are inspected and weighed at the land fill and a load ticket is prepared. The empty roll-off is returned to the compactor site, and a copy of the load receipt and an invoice is left with the operator. The operator double-checks the load receipts against the invoice, then submits the invoice to the facilities clerk for payment. The load receipts are then filed in chronological order by the operator.

Process-Oriented Environmental Training

Notes

Metals recovered from the waste stream are maintained at the job site until the storage bin is full. At that time, the operator chits the duty forklift operator to carry the bin to the scrap metal storage area where the bin is emptied into a 10 yard storage box. When the storage box is full, the contracted metal recycler is called to pick up the load. When the metal recycler arrives on site, the operator inspects the load, signs the weigh ticket and then submits the ticket to the facilities clerk for billing. The load ticket is then filed in chronological order by the operator.

Any potential hazardous waste which is removed from the waste stream is stored in sealed containers. The containers are then transported by the duty forklift operator to the hazardous waste/reclamation yard for waste determination and disposal.

During the time between processing loads, the operator sweeps the area within the waste processing yard to remove any waste or trash from the ground. Liquid spills or machinery leaks are also cleaned up using appropriate spill clean-up materials. Spill clean-up residue is managed as hazardous waste and contained in a seal container.

Permit Requirements:

Air Pollution Control District:
Permit to Operate - Internal Combustion Engine, Willcomb Compactor

Regional Water Quality Control Board:
Waste Discharge Requirements

Stormwater NPDES Permit:
Discharge of stormwater from industrial activity area

Compliance Training Subjects:

Air Emission Permits
Asbestos Containing Materials Management
Containment Practices

Process-Oriented Environmental Training

Notes

Process-Oriented Environmental Training

Fugitive Emissions
Hazardous Communication Standard
Hazardous Substance Storage
Hazardous Waste Accumulation Time
Hazardous Waste Classification
Hazardous Waste Containers
Hazardous Waste Disposal
Hazardous Waste Emergency Contingency Plans
Hazardous Waste Generator Responsibilities
Hazardous Waste Labels/Placards/Markings
Hazardous Waste Storage
Hazardous/Non-hazardous waste manifesting
Material Safety Data Sheets
Medical Waste Management
NPDES Permits Requirements
Oil Spills
PCB Disposal and Storage
Pesticides
Recording keeping
Recycling Requirements
Solid Waste Management
Stormwater Discharge Permits
Used Oil Management
Waste Minimization

Notes

The above-mentioned list of training areas now form the table of contents for a process specific training manual. Each training area list should typically be only one or two pages long, providing specific direction as related to the process itself. The trainer must be prepared to update the material as requirements change.

Environmental Issues of Concern to Shipyards

SESSION TITLE: Overview of Shipyard Environmental Requirements.

OBJECTIVE: To provide an overview of environmental requirements to which the shipyard may be subject.

Introduction: Due to their location at the interface of land, air and water, and because of the types of work processes employed at shipyards, they are subject to most environmental requirements. Often work processes and equipment in the shipyard will be subject to multiple requirements from different environmental statutes and regulations. For example, abrasive blasting operations could be subject to clean air requirements (permits to operate, certified abrasives, nuisance prohibitions,) clean water requirements (NPDES permit discharge prohibitions, storm water Best Management Practices), and hazardous waste requirements (waste characterization, proper storage and labeling, waste disposal). For this reason it is usually more convenient to look at shipyard processes and operations and determine which requirements apply, rather than looking at environmental requirements and trying to determine which process or operation they may effect.

Shipyard Processes and Environmental Requirements: Shipyard's processes consist of three elements: 1) materials, 2) equipment and 3) work practices. These elements combined produce the desired work product or result. Each element can be subject to environmental requirements. In the following section we will be addressing those shipyard processes that are considered to be major and/vital to shipyard operations. As a detailed listing of shipyard processes, operations and their environmental requirements would require a extensive training period (several days, if not longer), these requirements will be addressed in an overview fashion.

The following shipyard processes and activities will comprise the majority of the process oriented environmental requirements.

- Dry Abrasive Blasting

Overview of Shipyard Environmental Requirements.

Notes:

Environmental Issues of Concern to Shipyards

- Marine Coating Operations
- Bilge and Tank Cleaning
- Petroleum and Organic Liquid Transfers
- Operation of Internal Combustion Devices
- Operation of External Combustion Devices

In the following sessions, each of these processes or activities is flowcharted and those points in the flowchart that have potential environmental compliance issues are identified. By reviewing the flowchart and the associated training material, an overview of the environmental requirements of concern to shipyards for that process can be obtained.

Overview of Shipyard Environmental Requirements.

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Environmental Issues of Concern to Shipyards

Dry Abrasive Blasting Environmental Requirements

Introduction

Dry abrasive blasting in the shipyard is subject to air, water, transportation, storage and disposal requirements. Some of these requirements may or may not be applicable to all shipyards depending upon their location and other parameters. The following table provides an outline of environmental requirements of concern to shipyards. The requirements are referenced to the dry abrasive blasting process flow chart attached to this training session.

Table 1 Dry Abrasive Blasting - Environmental Concerns for Shipyards

Flowchart Number	Requirements	Comments
1,2	In some states abrasive blast media must be certified for out-of-doors, unconfined blasting. Any purchases of abrasive media to be used out-of-doors must have this certification, if required by state regulations.	There are significant differences in the emission rate of particulate matter between various types of dry abrasive media. While production issues of productivity rate, material compatibility and cost must be foremost in the selection of abrasive media, when a choice of media is allowable, factors such as particulate emission rates, reuse and recyclability, and disposal volume should guide the purchase selection.
3	The shipyard NPDES permit and/or stormwater discharge permit may contain Best Management Practices or Stormwater Pollution Prevention requirements that regulate the storage of abrasive blast material on-site.	Virgin abrasive blast media may contain metal contaminates in high enough concentrations to be of concern as a potential source of pollution to soil or water. Unconfined spills of virgin abrasive blast media should be cleaned up as soon as possible to prevent its potential discharge to storm drains or surface waters.
4	The shipyard NPDES permit and/or stormwater discharge permit may contain Best Management Practices or Stormwater Pollution Prevention requirements that regulate the transfer of	Virgin abrasive blast media may contain metal contaminates in high enough concentrations to be of concern as a potential source of pollution to soil or water. Unconfined

Flowchart Number	Requirements	Comments
	abrasive blast material on-site.	spills of virgin abrasive blast media should be cleaned up as soon as possible to prevent its potential discharge to storm drains or surface waters.
5	The shipyard NPDES permit and/or stormwater discharge permit may contain Best Management Practices or Stormwater Pollution Prevention requirements that regulate the transfer of abrasive blast material on-site.	Virgin abrasive blast media may contain metal contaminates in high enough concentrations to be of concern as a potential source of pollution to soil or water. Unconfined spills of virgin abrasive blast media should be cleaned up as soon as possible to prevent its potential discharge to storm drains or surface waters.
6	The shipyard NPDES permit and/or stormwater discharge permit may contain Best Management Practices or Stormwater Pollution Prevention requirements that regulate the transportation of abrasive blast material on-site.	Virgin abrasive blast media may contain metal contaminates in high enough concentrations to be of concern as a potential source of pollution to soil or water. Unconfined spills of virgin abrasive blast media should be cleaned up as soon as possible to prevent its potential discharge to storm drains or surface waters.
7	The shipyard NPDES permit and/or stormwater discharge permit may contain Best Management Practices or Stormwater Pollution Prevention requirements that regulate the transfer of abrasive blast material on-site,	Virgin abrasive blast media may contain metal contaminates in high enough concentrations to be of concern as a potential source of pollution to soil or water. Unconfined spills of virgin abrasive blast media should be cleaned up as soon as possible to prevent its potential discharge to storm drains or surface waters.
	Equipment used to conduct abrasive blasting operations may require a permit to operate from a state or federal air quality agency. A permit to operate will	The specific equipment and procedures used for abrasive blasting can have a significant effect on the amount and types of waste generated.

Flowchart Number	Requirements	Comments
8	typically contain requirements regarding how the equipment is operated and maintained. Additionally, a permit may regulate what and how much abrasive material may be used with the equipment on a daily and/or annual basis.	Significant reduction in the volume of particulate emissions and spent abrasive volume can be achieved by ensuring equipment is properly utilized, good industrial practices are followed and workers are trained to conduct blasting operations at maximum efficiency.
9	Dry abrasive blasting will result in the generation of particulate emissions. These emissions may be regulated by opacity restrictions or by nuisance prohibitions. In areas of the United States that are in non-attainment for particulate matter, TPM, PM10 and/or PM25 may be restricted by state regulation.	The amount of particulate emissions generated during blasting operations is effected by several factors including the type of media used, the substrate being cleaned and air pressure used in blasting operations. In many cases, many of these variables can be adjusted to minimize the amount of emissions.
10	Containment of dry abrasive blasting operations may be required by Best Management Practices contained in the facility NPDES permit. Additionally, containment may be an indirect requirement of an NPDES permit prohibition on discharges of waste to the water. Stormwater Pollution Prevention requirements provide for containment of abrasive blasting dust.	Containment material such as traps and screens should be cleaned on an as needed basis to prevent the build-up of contamination for abrasive blasting dust. Storage of containment material should be done to prevent contact with stormwater and potential discharge of pollutants to the storm drains.
11	Air pollution control devices, such as cyclones or baghouses, typically require a permit to operate. These permits will often require monitoring to ensure minimal effectiveness is achieved. Recordkeeping is usually required to demonstrate compliance with the permit and local rules and regulations.	A regular preventative maintenance program for air pollution control devices will ensure proper performance during operation.
	Dust derived from abrasive blasting operations should be properly	Ensure that not only bag house dust, but also dust cleaned from

Flowchart Number	Requirements	Comments
12	containerized and labeled. The dust is a waste and as such must be evaluated as a potential hazardous waste. If determined to be a hazardous waste, all requirements for containerization of a hazardous waste will apply.	equipment, material and the facility is properly contained and controlled.
13	Spent abrasive media is considered to be a waste, and as such must be evaluated as a potential hazardous waste. If determined to be hazardous, spent abrasive is subject to all hazardous waste The facility NPDES may contain Best Management Practices that contain specific requirements for spent abrasive media.	In some states, spent is considered to be a special waste and is subject to requirements for management and disposal.
14	Removal of spent abrasive from the work area may be subject to Best Management Practices in the facility NPDES permit to reduce the potential for discharge to the water.	Dust generated during removal of spent abrasive should be minimized to prevent the spread of contamination to the facility where it may come in contact with stormwater.
15	The shipyard NPDES permit and/or stormwater discharge permit may contain Best Management Practices or Stormwater Pollution Prevention requirements that regulate the transportation of spent abrasive blast material on-site. If spent abrasive is determined to be a hazardous waste, all hazardous waste generator storage requirements will be applicable. Contaminated, but not non-hazardous, spent abrasive may be subject to Best	Spent abrasive should always be considered a potential source of contamination to the water via the storm drain system. Spills of abrasive should be removed from the ground as soon as possible.

Flowchart Number	Requirements	Comments
	Management Practices contained in the facility NPDES permit and/or Stormwater Pollution Prevention Plan.	
16	Potential disposal options for spent abrasive are influenced by the type and concentration of contaminates, potential for reclamation and reuse on site, and recycling opportunities.	Implementing source segregation procedures will minimize the amount of hazardous waste generated from abrasive blasting operations. This can decrease disposal costs and increase the reuse and recycling options.
17	Abrasive media that is intended to be reused on site often requires some treatment to improve performance or meet minimum standards. If the spent abrasive has been determined to be a hazardous waste, on site treatment is subject to hazardous waste treatment requirements.	
18	Size classification of spent abrasive media prior to reuse on site is often necessary to remove dust and other "non-productive" sizes of particulates. If an air classifier with a dust collection device is used, it may be subject to permitting requirements as a air pollution control device.	
19	Removal of contaminates, particularly inorganic salts, prior to reuse of spent abrasive on site is often necessary to ensure that the media meets appropriate material standards. If the spent abrasive has been determined to be a hazardous waste, on site treatment is subject to hazardous waste treatment requirements. If contaminates are removed by washing with water, the discharge of the waste	

Flowchart Number	Requirements	Comments
	water can be subject to requirements or prohibitions contained in the facility NPDES permit or pretreatment standards for discharge to the POTW.	
20	Waste material derived from these processes must be evaluated to determine if they are hazardous wastes. If hazardous, these wastes are subject to all requirements for a hazardous waste.	
21	Loading and transportation of spent abrasive may be subject to specific Best Management Practices contained in the facility NPDES permit to prevent potential discharge to water. If classified as a hazardous or special waste, transportation of the material to the recycling or disposal site may be subject to transportation regulations for hazardous materials.	Spillage must be immediately cleaned up to prevent discharge of spent abrasive to the storm drain system.
22	Recycling of spent abrasive can be subject to both federal and state waste recycling regulations depending upon several factors, including the type and concentration of contaminates in the waste, and how the product produced from the spent abrasive will be used.	
23	Land filling spent abrasive will be subject to the local restrictions of the receiving landfill.	

Environmental Requirements of Concern to Shipyards

Marine Coating Application Environmental Requirements

Introduction

Marine coating application in the shipyard is subject to air, water, transportation, storage and disposal requirements. Some of these requirements may or may not be applicable to all shipyards depending upon their location and other parameters. The following table provides an outline of environmental requirements of concern to shipyards. The requirements are referenced to the marine coating application process flow chart attached to this training session.

Table 1 - Marine Coating Application - Environmental Concerns for Shipyards

Flowchart Number	Requirements	Comments
1	Marine coatings containing VOC must meet established limits for shipyards subject to the Federal Shipyard NESHAP or State ozone non-attainment requirements.	The shipyard may purchase non-compliant coatings, but may not apply the coating in the shipyard.
2	Storage of flammable liquids is subject to local fire code requirements. The Federal Shipyard NESHAP requires that the storage of marine coatings be done in a manner that prevents or reduces VOC emissions due to spillage or leaks.	Proper storage practices will reduce accidents, spillage and waste due to limitations on material storage time. Secondary containment of stored materials can prevent the spread of leaks from damage containers.
3	Transportation of hazardous materials over public roads is regulated by the Department of Transportation. The Federal Shipyard NESHAP requires that transportation of marine coatings be done in a manner that prevents or reduces VOC emissions due to spillage or leaks.	Improper transportation of containers of marine coatings is a primary reason for spills in the shipyard. Paint spillage results in the loss of product, an increase in hazardous waste, loss of production area and time, and an increase in the potential level of contamination to the ground and stormwater.
4	Dispensing, mixing and thinning of flammable liquids are subject to local fire code requirements. The Federal Shipyard NESHAP requires that marine coatings not be thinned with VOC containing thinners above the	The Federal Shipyard NESHAP has extensive record keeping and reporting requirements necessary to demonstrate that the shipyard is in compliance with the regulation. Shipyards subject to the NESHAP are also subject to the requirement of

Flowchart Number	Requirements	Comments
	allowable VOC limits. Additionally, the NESHAP requires that the dispensing, mixing and thinning of marine coatings be done in a manner that prevents or reduces VOC emissions due to spillage or leaks.	having a Title V operating permit. Any violations of the NESHAP must be identified in the Title V semi-annual compliance certification.
5	Transfer of flammable liquids is subject to local fire code requirements. The Federal Shipyard NESHAP requires that the transfer of marine coatings be done in a manner that prevents or reduces VOC emissions due to spillage or leaks.	Proper transfer practices will reduce accidents and spillage. Secondary containment of the transfer operation will prevent the spread of spillage and possible ground water or stormwater contamination.
6	The application of marine coatings is subject to the as-applied VOC limitations established in the Federal Shipyard NESHAP. Additionally, local ozone non-attainment requirements may limit the as applied VOC content of marine coatings.	VOC emissions from marine coating operations can be reduced by using good pollution prevention practices. Use of low or no VOC coatings can be used in some coating applications. If required, thinning with VOC containing thinners should be kept to the minimum amount necessary to achieve the proper performance standard of the coating.
7	Marine coating application permit requirements may limit the daily and/or annual coating usage or VOC emissions at the shipyard.	
8	Overspray from spray paint operations may contain toxic compounds subject to local toxic emission control requirements. Best Management Practices contained in the facility NPDES Permit may establish requirements to eliminate or reduce the amount of overspray discharged to the water from marine coating operations. Stormwater pollution prevention practices may require procedures to	Particulate (overspray) emissions from marine coating operations can be reduced by using good pollution prevention practices. Using proper coating application procedures will increase the transfer efficiency and decease the amount of overspray generated. The amount of overspray generated can be reduced by using containment during out-of-doors painting operations.

Flowchart Number	Requirements	Comments
	prevent overspray from coming into contact with rain or other precipitation.	
9	Equipment cleaning (hoses and spray guns) using VOC containing solvents may be regulated by local air regulations in ozone non-attainment areas. Additionally, some cleaning solvents are classified as hazardous air pollutants and may be regulated under local toxic emission regulations. Coating application permits often contain requirements regarding the use of VOC and/or toxic solvents in cleaning application equipment.	VOC and toxic emissions can be reduced by using an enclosed gun and hose cleaning system. Additionally, cleaning solvent can be captured, reclaimed and reused on site for equipment cleaning or other surface preparation needs. This will greatly reduce the annual cost for purchase of new cleaning solvent as well as reduce harmful air emissions.
10	Waste paint must be properly containerized and disposed. Many marine coatings will be hazardous waste depending upon the types of metals and solvents the waste coating contained. Cans and pails that contained marine coatings that were hazardous must be treated as hazardous waste unless the container is "empty."	Consolidation of paint wastes by types will reduce the cost of disposal and increase the number of disposal or recycling options. For example, paints with a high residual BTU content may be recycled by a fuel blending facility, rather than landfilling.
11	Containment materials, such as curtains or shrink wrap, can become contaminated with overspray and other pollutants and must be cleaned regularly and/or disposed of properly. In some instances, spent containment materials may be a hazardous waste.	Clean containment screen and other reusable containment materials on a regular basis to remove the build-up of contamination. Dust and overspray removed from containment materials should be evaluated to determine if the waste is a hazardous waste.
12	Coating application in a paint booth or interior space onboard a ship will typically use control equipment for VOCs and/or overspray emissions. Specific permit requirements may apply to air pollution control devices used in these applications.	Control devices must be maintained to achieve the required level of control. Proper preventative maintenance is necessary to ensure compliance with permit conditions.

Environmental Requirements of Concern to Shipyards

Flowchart Number	Requirements	Comments
13	Spent containment materials may be hazardous, depending on process specific factors, and must be evaluated regarding its potential to be a hazardous waste prior to disposal. Proper containerization and labeling is required at the point of generation of a hazardous waste. Waste generated from air pollution control devices are often hazardous and must be managed as hazardous wastes. Proper containerization and labeling is required at the point of generation of a hazardous waste.	Store containment materials, such as screen and shrink wrap, in such a manner as to prevent contact with stormwater and the potential discharge of pollutants to the stormwater drainage system.
14	Transportation of waste products from containment and/or air pollution control devices, is subject to Department of Transportation regulations if conducted on or over public roads. On-site transportation of waste products must be in compliance with company policy with regard to the transportation of hazardous materials and/or waste. Storage of hazardous waste is subject to hazardous waste generator requirements.	Improper transportation of containers of waste is a potential source of hazardous spills in the shipyard. Spills result in loss of production area and time, and an increase in the potential level of contamination to the ground and stormwater. Satellite storage of hazardous waste is allowed if federal (and any state) requirements are met.
15,16,18	Options for wastes generated during marine coating operations include reuse, recycling and disposal. In many cases, coating wastes will be hazardous and subject to the generator requirements for hazardous wastes. These requirements include proper containerization, storage, labeling, manifesting and disposal.	Hazardous waste must be manifested to a permitted Treatment, Storage and Disposal Facility ("TSDF"). In most circumstances, 90 days is the maximum a hazardous waste may stay on site prior to transport to a TSDF.
17	Transportation of waste products is subject to Department of Transportation regulations if conducted on or over public roads. On-site transportation of waste products	

Flowchart Number	Requirements	Comments
	must be in compliance with company policy with regard to the transportation of hazardous materials and/or waste.	

Tank and Bilge Cleaning Environmental Requirements

Introduction

Tank and bilge cleaning in the shipyard is subject to air, water, transportation, storage and disposal requirements. Some of these requirements may or may not be applicable to all shipyards depending upon their location and other parameters. The following table provides an outline of environmental requirements of concern to shipyards. The requirements are referenced to the tank and bilge cleaning process flow chart attached to this training session.

Table 1 - Tank and Bilge Cleaning - Environmental Concerns for Shipyards

Flowchart Number	Requirements	Comments
1	33 CFR 154 contains the requirements that apply to marine transportation related facilities (including shipyards) that are capable of transferring oil or hazardous substances in bulk to or from fixed, or mobile, onshore facilities to or from a vessel. Prior to conducting transfer operations, the facility must have an approved Operations Manual that meets the requirements contained in 33 CFR 154. The facility's Operations Manual may contain specific requirements regarding the staging of transfer equipment at the facility prior to commencing transfer operations.	When staging equipment used in the transfer and storage of petroleum products and/or oily water, it is important to consider the potential for discharge in the event of an accident. The location and protection of storm drains and other conveyances to the water should be considered prior to staging pumps, hose, tanks and/or trucks.
2	The facility's Operations Manual may contain specific requirements regarding the staging of transfer hoses at the facility prior to commencing transfer operations.	The Coast Guard regulations contain specific requirements with regard to transfer hoses, including marking, material compatibility, couplings, testing and recordkeeping.

Environmental Issues of Concern to Shipyards

Flowchart Number	Requirements	Comments
3	The facility's Operations Manual may contain specific requirements regarding the staging of transfer pumps at the facility prior to commencing transfer operations.	Pumps are a potential source of spills and leaks during transfer operations. This potential can be significantly reduced in several ways, including providing secondary containment for the pump, ensuring proper hose connections are made, and properly maintaining the pumps.
4	Transfer operations are subject to all requirements imposed by the Coast Guard, including an Operations Manual, equipment requirements, and facility operations.	A Response Plan is required if the facility has the potential to cause substantial harm, or significant and substantial harm to the environment by discharging oil into or on the navigable waters or adjoining shoreline.
5	The facility's Operations Manual may contain specific requirements regarding the berming for tanks during transfer operations.	The use of portable berms for tanker trucks and/or portable holding tanks will help prevent the most common type of spills that occur during transfer operations - overfilling the tank.
6	The facility's Operations Manual may contain specific requirements regarding tanker trucks used to receive transfer fluids during transfer operations.	
7	The facility Operations Manual may contain specific requirements regarding portable holding tanks used to receive transfer fluids during transfer operations.	
8	Waste products produced from tank and bilge cleaning is typically oily water, with an oil content of less than 5 %. In several states, waste oily water is considered a hazardous waste and is subject to the requirements for a hazardous waste, including proper storage, labeling and disposing.	In some instances, metals and/or other organics, other than petroleum products, may be in significant concentrations in the waste stream. This can significantly effect the regulatory requirements, on-site treatment requirements and disposal options.

Environmental Issues of Concern to Shipyards

Flowchart Number	Requirements	Comments
9	Active treatment of oily waste water, such as an oil-water separator or pH adjustment to de-emulsify the oil, may require a waste treatment permit.	While a treatment permit is not currently required under federal regulations, several states require permits to separate oil from water.
10	Passive treatment of oily waste water, such as passive phase separation of the oil and water may require a waste treatment permit.	While a treatment permit is not currently required under federal regulations, several states require a permit to separate oil from water.
11		Tanks holding hazardous waste must meet the specific federal standards and requirements for such tanks.
12	Waste oil separated from oily water derived from tank and bilge cleaning may meet the definition of "Used Oil." Used oil is subject to the federal management standards and requirements.	
13	Waste water derived from active or passive treatment processes may contain residual contaminates in concentrations high enough to be of concern for discharge.	
14	Sludge waste derived from tank and bilge cleaning must be evaluated to determine if it is a hazardous waste. If so, it is subject to all the requirements for generators of hazardous waste including proper containers, labeling and disposal.	
15	Untreated oily water is usually transported directly to a treatment facility for treatment. Transport of this waste will be subject to all applicable Department of Transportation requirements for the transportation of a hazardous material or waste.	

Environmental Issues of Concern to Shipyards

Flowchart Number	Requirements	Comments
16	Waste water derived from tank and bilge cleaning is normally discharged to the industrial waste water sewer system and therefore is subject to local pretreatment standards and discharge regulations. If tank and bilge cleaning process waste water is discharged to the receiving waters, it is subject to NPDES permit requirements and prohibitions.	
17	Transportation of oily water and/or oil sludge to a treatment facility requires proper transportation documents, such as a bill of lading or hazardous waste manifest. The treatment facility receiving the waste must be properly permitted to treat (or recycle) the waste product.	

Environmental Requirements of Concern to Shipyards

Internal Combustion Environmental Requirements

Introduction

Internal combustion operations in the shipyard may be subject to air, water, transportation, storage and disposal requirements. Some of these requirements may or may not be applicable to all shipyards depending upon their location and other parameters. The following table provides an outline of environmental requirements of concern to shipyards. The requirements are referenced to the internal combustion process flow chart attached to this training session.

Table 1 - Internal Combustion - Environmental Concerns for Shipyards

Flowchart Number	Requirements	Comments
1	The type and quantity of air emissions derived from the combustion of fuel oil is dependent to a large extent on the composition of the fuel. Local rules in areas in non-attainment for NOX and/or SOX may place restrictions on the concentration of certain components, such as sulfur compounds in fuel oil or natural gas.	Sampling and testing of fuel to demonstrate compliance with permit conditions can be required. Alternatively, a certification from the supplier regarding the maximum allowable concentrations of restricted constituents may be acceptable.
2	Fuel oil is most often delivered to a site via tanker truck. Transportation by truck is regulated by Department of Transportation requirements for transport of oil and hazardous substances.	
3	Transfer of petroleum products from a tanker truck to a storage tank can be subject to the requirements contained in the facility's Spill Prevention, Control and Countermeasures Plan ("SPCC"). The Stormwater Pollution Prevention Plan may contain specific measures regarding the transfer of oil on site to prevent the potential discharge of oil to stormwater.	A common cause of oil spills in many facilities is the failure to follow proper transfer procedures. Spill response equipment and personnel should be immediately available to contain and remove any oil that is accidentally discharged during a transfer.
4	Underground tanks that contain petroleum products or hazardous substances are subject to regulation,	

Flowchart Number	Requirements	Comments
	including structural requirements, testing and recordkeeping. The Stormwater Pollution Prevention Plan may contain specific measures regarding underground storage tanks to prevent the potential discharge of oil to stormwater.	
5	Aboveground tanks may be subject to requirements contained and locally adopted Uniform Fire Code provisions. Stormwater Pollution Prevention Plan may contain specific measures regarding on site above ground storage tanks to prevent the potential discharge of oil to stormwater.	
6	Transfer of petroleum products from a storage tank to a fuel truck or tote can be subject to the requirements contained in the facility's Spill Prevention, Control and Countermeasures Plan ("SPCC"). The facility's Stormwater Pollution Prevention Plan may contain specific measures regarding the transfer of oil on site to prevent the potential discharge of oil to stormwater.	A common cause of oil spills in many facilities is the failure to follow proper transfer procedures. Spill response equipment and personnel should be immediately available to contain and remove any oil that is accidentally discharged during a transfer.
7	Transport of petroleum products on site via a fuel truck or tote can be subject to the requirements contained in the facility's Spill Prevention, Control and Countermeasures Plan ("SPCC"). The Stormwater Pollution Prevention Plan may contain specific measures regarding the transfer of oil on site to prevent the potential discharge of oil to stormwater.	
8	Transfer of petroleum products from a fuel truck or tote to a fuel tank for a boiler or furnace can be subject to the	A common cause of oil spills in many facilities is the failure to follow

Flowchart Number	Requirements	Comments
	requirements contained in the facility's Spill Prevention, Control and Countermeasures Plan ("SPCC"). The Stormwater Pollution Prevention Plan may contain specific measures regarding the transfer of oil on site to prevent the potential discharge of oil to stormwater.	proper transfer procedures. Spill response equipment and personnel should be immediately available to contain and remove any oil that is accidentally discharged during a transfer.
9	Internal combustion engines can be subject to emission source device permitting requirements. These requirements can include restrictions on the type or amount of fuel used, hours of operations, emission controls, recordkeeping and preventative maintenance.	Any new source, or major modification to an existing source, may require a pre-construction review and/or permit prior to operation of the device.
10	NOX is a criteria air pollutant that may be subject to federal and state emission restrictions and requirements. In some instances, the amount of NOX emitted may be limited by restrictions on the device operation or the fuel consumed.	State and local regulations regarding the emission of NOX will be found in areas of the United States that are in non-attainment for ozone.
11	SOX is a criteria air pollutant that may be subject to federal and state emission restrictions and requirements. In some instances, the amount of SOX emitted may be limited by restrictions on the device operation or the fuel consumed.	SOX is one the principle targets of the acid rain control program.
12	Particulate Matter is a criteria air pollutant that may be subject to federal and state emission restrictions and requirements. In some instances, the amount of Particulate Matter emitted may be limited by restrictions on the device operation or the fuel consumed.	Particulate matter formed from fuel combustion is a result of incomplete combustion, and chemical condensation reactions. Fuel oil combustion results in much greater emission of particulate matter than natural gas combustion.

Environmental Requirements of Concern to Shipyards

External Combustion Environmental Requirements

Introduction

External combustion operations in the shipyard may be subject to air, water, transportation, storage and disposal requirements. Some of these requirements may or may not be applicable to all shipyards depending upon their location and other parameters. The following table provides an outline of environmental requirements of concern to shipyards. The requirements are referenced to the external combustion process flow chart attached to this training session.

Table 1 - External Combustion - Environmental Concerns for Shipyards

Flowchart Number	Requirements	Comments
1	The type and quantity of air emission derived from the combustion of fuel is dependent to a large extent on the composition of the fuel. Local rules in areas in non-attainment for NOX and/or SOX may place restrictions on the concentration of certain components, such as sulfur compounds in fuel oil or natural gas.	Sampling and testing of fuel to demonstrate compliance with permit conditions can be required. Alternatively, a certification from the supplier regarding the maximum allowable concentrations of restricted constituents may be acceptable.
2	Fuel oil is most often delivered to a site via tanker truck. Transportation by truck is regulated by Department of Transportation requirements for transport of oil and hazardous substances.	
3	Natural gas is most often delivered to a site via a gas pipeline.	
4	Transfer of petroleum products from a tanker truck to a storage tank can be subject to the requirements contained in the facility's Spill Prevention, Control and Countermeasures Plan ("SPCC"). The Stormwater Pollution Prevention Plan may contain specific measures regarding the transfer of oil on site to prevent the potential discharge of oil to stormwater.	A common cause of oil spills in many facilities is the failure to follow proper transfer procedures. Spill response equipment and personnel should be immediately available to contain and remove any oil that is accidentally discharged during a transfer.

Environmental Requirements of Concern to Shipyards

Flowchart Number	Requirements	Comments
5	Underground tanks that contain petroleum products or hazardous substances are subject to regulation, including structural requirements, testing and recordkeeping. The Stormwater Pollution Prevention Plan may contain specific measures regarding underground storage tanks to prevent the potential discharge of oil to stormwater.	
6	Aboveground tanks may be subject to requirements contained and locally adopted Uniform Fire Code provisions. Stormwater Pollution Prevention Plan may contain specific measures regarding on site above ground storage tanks to prevent the potential discharge of oil to stormwater.	
7	Transfer of petroleum products from a storage tank to a fuel truck or tote can be subject to the requirements contained in the facility's Spill Prevention, Control and Countermeasures Plan ("SPCC"). The facility's Stormwater Pollution Prevention Plan may contain specific measures regarding the transfer of oil on site to prevent the potential discharge of oil to stormwater.	A common cause of oil spills in many facilities is the failure to follow proper transfer procedures. Spill response equipment and personnel should be immediately available to contain and remove any oil that is accidentally discharged during a transfer.
8	Transport of petroleum products on site via a fuel truck or tote can be subject to the requirements contained the facility's Spill Prevention, Control and Countermeasures Plan ("SPCC"). The Stormwater Pollution Prevention Plan may contain specific measures regarding the transfer of oil on site to prevent the potential discharge of oil to stormwater.	

Environmental Requirements of Concern to Shipyards

Flowchart Number	Requirements	Comments
9	Transfer of petroleum products from a fuel truck or tote to a fuel tank for a boiler or furnace can be subject to the requirements contained in the facility's Spill Prevention, Control and in Countermeasures Plan ("SPCC"). The Stormwater Pollution Prevention Plan may contain specific measures regarding the transfer of oil on site to prevent the potential discharge of oil to stormwater.	A common cause of oil spills in many facilities is the failure to follow proper transfer procedures. Spill response equipment and personnel should be immediately available to contain and remove any oil that is accidentally discharged during a transfer.
10	External combustion engines can be subject to emission source device permitting requirements. These requirements can include restrictions on the type or amount of fuel used, hours of operations, emission controls, recordkeeping and preventative maintenance.	Any new source, or major modification to an existing source, may require a pre-construction review and/or permit prior to operation of the device.
11	NOX is a criteria air pollutant that may be subject to federal and state emission restrictions and requirements. In some instances, the amount of NOX emitted may be limited by restrictions on the device operation or the fuel consumed.	State and local regulations regarding the emission of NOX will be found in areas of the United States that are in non-attainment for ozone.
12	SOX is a criteria air pollutant that may be subject to federal and state emission restrictions and requirements. In some instances, the amount of SOX emitted may be limited by restrictions on the device operation or the fuel consumed.	SOX is one the principle targets of the acid rain control program.
13	Particulate Matter is a criteria air pollutant that may be subject to federal and state emission restrictions and requirements. In some instances, the amount of Particulate Matter emitted may be limited by restrictions on the device operation or the fuel consumed.	Particulate matter formed from fuel combustion results from incomplete combustion and chemical condensation reactions. Fuel oil combustion results in much greater emission of particulate matter than natural gas combustion.

Environmental Requirements of Concern to Shipyards

Petroleum and Organic Liquids Transfers - Environmental Requirements

Introduction

Petroleum and organic liquids transfer operations in the shipyard are subject to air, water, transportation, storage and disposal requirements. Some of these requirements may or may not be applicable to all shipyards depending upon their location and other parameters. The following table provides an outline of environmental requirements of concern to shipyards. The requirements are referenced to the petroleum and organic liquids transfers process flow chart attached to this training session.

Table 1 - Petroleum and Organic Liquids Transfers - Environmental Concerns for Shipyards

Flowchart Number	Requirements	Comments
1	33 CFR 154 contains the requirements that apply to marine transportation related facilities (including shipyards) that are capable of transferring oil or hazardous substances in bulk to or from fixed, or mobile, onshore facilities to or from a vessel. Prior to conducting transfer operations, the facility must have an approved Operations Manual that meets the requirements contained in 33 CFR 154. The facility Operations Manual may contain specific requirements regarding the staging of transfer equipment at the facility prior to commencing transfer operations.	When staging equipment used in transfer and storage of petroleum products and/or oily water, it is important to consider the potential for discharge in the event of an accident. The location and protection of storm drains and other conveyances to the water should be considered prior to staging pumps, hose, tanks and/or trucks.
2	The facility Operations Manual may contain specific requirements regarding the staging of transfer hoses at the facility prior to commencing transfer operations.	The Coast Guard regulations contain specific requirements with regard to transfer hoses, including marking, material compatibility, couplings, testing and recordkeeping.
3	The facility Operations Manual may contain specific requirements regarding the staging of transfer pumps at the facility prior to commencing transfer	Pumps are a potential source of spills and leaks during transfer operations. This potential can be significantly reduced in several ways, including

Environmental Requirements of Concern to Shipyards

Flowchart Number	Requirements	Comments
	operations.	providing secondary containment for the pump, ensuring proper hose connections are made and properly maintaining the pumps.
4	Transfer operations are subject to all requirements imposed by the Coast Guard, including a Operations Manual, equipment requirements, and facility operations.	A Response Plan is required if the facility has the potential to cause substantial harm, or significant and substantial harm to the environment by discharging oil into or on the navigable waters or adjoining shoreline.
5	Shut down of operations and breakdown of transfer equipment has the potential to result in discharges of petroleum product from residual material contained in the transfer system at shut down. The Operations Manual may contain specific requirements regarding shut down procedures intended to prevent the accidental discharge of oil.	A Response Plan is required if the facility has the potential to cause substantial harm, or significant and substantial harm to the environment by discharging oil into or on the navigable waters or adjoining shoreline.